

REMARKS

Claims 1-20 are pending, however, claims 1-10 and 15-18 have been withdrawn from consideration. Claims 11 and 19 are amended and claim 14 is canceled with this response. No new matter is added. Reconsideration of the application in light of the above amendments and the following remarks is respectfully requested.

I. OBJECTION TO THE CLAIMS

Claims 11 and 19 were objected to due to informalities. Both claims 11 and 19 have been amended to address such informalities. Accordingly, withdrawal of the rejection is respectfully requested.

II. REJECTION OF CLAIM 14 UNDER 35 U.S.C. § 112, SECOND PARAGRAPH

Claim 14 was rejected under 35 U.S.C. § 112, second paragraph for being indefinite. Claim 14 is canceled with this response, thereby rendering the above issue moot. Accordingly, withdrawal of the rejection is respectfully requested.

III. REJECTION OF CLAIMS 11-14 AND 19-22 UNDER 35 U.S.C. § 103(a)

Claims 11-14 and 19-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,316,805 (Lin et al.) in view of U.S. Patent No. 5,910,673 (Hsu et al.). Withdrawal of the rejection is respectfully requested for at least the following reasons.

- i. Lin et al. do not teach or suggest a well region having first and second regions therein with the contact isolation structure therebetween, as recited in claim 11.***

Claim 11 is directed to a method of forming a low resistance semiconductor varactor that comprises forming a well region between first and second isolation regions. First and second active regions are then formed or defined in the well region

by forming a contact isolation structure in the well region. Thus the formation of the contact isolation structure defines the first and second active regions ***in the well region*** by, for example, bisecting the well region. One example of such process is illustrated in Fig. 2a of the application where the contact isolation structure 32 formed in the n-well 20 defines first and second active regions 60 and 65, respectively. Although the example highlighted in Fig. 2a is identified herein for aid in appreciating the meaning of claim terminology, it should be understood that such example is not intended to limit the scope of the invention of claim 11 in any fashion. It is respectfully submitted that the above feature is, contrary to the assertion in footnote 1 in the Office Action dated June 20, 2005, not taught in Lin et al.

In the Office Action, it is conceded that Fig. 8 and the corresponding description of the Lin et al. reference does not teach first and second active regions within a well region as recited in claim 11. However, in footnote 1 the Office Action cites Col. 5, lines 17-22 of the prior art reference for the proposition that the reference contemplates the well region on both sides of an STI, and thus teach two active regions as claimed. Applicants respectfully disagree, and submit that such a conclusion is not consistent with a full reading of the reference.

The section of Lin et al. cited in the Office Action is claim 1 thereof, and the pertinent portion is provided below:

a doped region having a side, said doped region being below
said gate oxide layer and being on the two sides of said STI;
an N well region, said N well being below said field implant
region, said STI, said gate oxide and below the side of said doped
region....

According to the Federal Circuit, the terms highlighted above are to be read in light of the specification and drawings in order to be fully appreciated by one of ordinary skill in the art. Clearly, the doped region above is NOT the N well region (e.g., N well 320 of Fig. 8), since the N well region is recited separately and is indicated as being below the side of the doped region. Thus the statement in footnote 1 in the Office Action stating that such region constitutes the well region on both sides of the STI

cannot be correct. Further, the doped region is not a deep N well region (e.g., deep N well 421, 431 of Figs. 12 and 13), since this element is further recited separately in dependent claim 5.

Upon reading the entire specification and evaluating the drawings, it appears that the “doped region” of claim 1 refers to the source/drain regions 315 of Fig. 8 since they are doped regions (NOT a well region) and each resides on opposite sides of the STI 312. Further, in such an instance, the N well region in the cited claim 1 is below “the side of said doped region” in that the N well 320 is below one of the source/drain regions 315, as shown in Fig. 8 and the other figures. ***This interpretation is further buttressed by dependent claim 3 of Lin et al. that further recites an LDD region between the STI and the doped region.***

Therefore the conclusion posited in the Office Action that the “doped region” in claim 1 of Lin et al. covers the well region as recited in claim 11 of the present invention is incorrect. Consequently, Lin et al. do not teach the feature at issue and Hsu et al. fail to remedy the deficiency in Lin et al. Thus claim 11 is non-obvious over the cited art. Accordingly, withdrawal of the rejection of claim 11 and its associated depending claims is respectfully requested.

ii. Lin et al. do not teach forming contact regions of the first conductivity type in the well region of the same conductivity type, as recited in claim 19.

Claim 19 is directed to a method of forming a semiconductor varactor. The method comprises forming a well region of a first conductivity type in a semiconductor substrate, and forming contact regions of the first conductivity type in the well region. Lin et al. do not teach this feature. As highlighted above, Lin et al. teach a well region 320, as illustrated in Fig. 8, however, contact regions 315 are not both in the well region as recited claim 19. Further, as discussed *supra*, the interpretation set forth in footnote 1 of the Office Action is incorrect, and Hsu et al. fail to remedy the deficiency in Lin et al. Therefore claim 19 is not disclosed by the cited art, and is therefore non-obvious

thereover. Accordingly, withdrawal of the rejection of claim 19 and its associated depending claims is respectfully requested.

iii. The combination of Lin et al. and Hsu et al. is improper because the requisite motivation for the combination does not exist.

It is conceded that cited art may be combined together under the appropriate circumstances. Such combinations are proper when motivation for such a combination is found; and such motivation may be found within the references themselves, by the nature of the problem to be solved, and in the knowledge of persons of ordinary skill in the art. MPEP § 2143.01 (*citing In re Rouffet*, 47 USPQ2d 1453 1457-58 (Fed. Cir. 1998)). Such motivation, however, cannot be vague and conclusory; rather such a finding must be ***clear and particular***. *In re Dembiczak*, 50 USPQ2d 1614 (Fed. Cir. 1999). It is respectfully submitted that upon an appropriate application of the above standard, the combination of Lin et al. and Hsu et al. is improper for at least the following reasons.

Initially, the rationale for combining the art provided in the Office Action is conclusory and vague. In combining the cited references, the Office Action states:

At the time of the invention it would have been obvious to a person of ordinary skill in the art to include the step of forming electrical contacts to a gate conductive layer, wherein said electrical contacts are formed over a contact isolation structure. The motivation for doing so, as is taught by Hsu et al., is electrically connecting active regions to interface with other metal levels subsequently fabricated (Col. 5, lines 10-13). (Office Action, 6/20/05, p. 5, ¶3).

It is respectfully submitted that upon an appropriate understanding of Lin et al., it will be clear that the requisite motivation to combine together the cited art does not exist. Lin et al. disclose an ESD structure that comprises only two terminals that externally couple to other device components, namely the respective source/drain regions 215. As highlighted in Col. 3, lines 38-50 of Lin et al., for example, the ESD device is triggered by breakdown at a source/drain region, and the breakdown current

path extends down into the substrate, around the STI structure, and back up and over to the other source/drain region. ***No gate connection is provided or discussed in Lin et al. because the gate electrode is not involved in the breakdown operation nor in the triggering of the ESD device, and consequently the gate is not connected to any other component.*** Therefore, based on the structure/design of Lin et al., one of ordinary skill in the art would not have been motivated to modify the reference in accordance with the present invention because ***adding a gate electrode is unnecessary for the intended device operation of Lin et al., and addition of such structure would not improve or alter the operation thereof.*** Therefore the Office Action is incorrect in stating the one of ordinary skill in the art would have been motivated to add the gate contact of Hsu et al. to Lin et al. to interface with other metal levels. Therefore the combination of the references is improper because no motivation for the combination exists. Accordingly, withdrawal of the rejection is respectfully requested for at least this additional reason.


IV. CONCLUSION

For at least the above reasons, the claims currently under consideration are believed to be in condition for allowance.

Should the Examiner feel that a telephone interview would be helpful to facilitate favorable prosecution of the above-identified application, the Examiner is invited to contact the undersigned at the telephone number provided below.

Should any fees be due as a result of the filing of this response, the Commissioner is hereby authorized to charge the Deposit Account Number 20-0668, TI-30681.

Respectfully submitted,
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CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Mail Stop Amendment, Assistant Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Date: September 20, 2005


Christine Gillroy